Cutaneous Sympathy

March 10

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admitted March 24th 1821

An Essay

On Cutaneous Sympathy

By

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During the revolutions which have marked the progress of medical science, the excretory function of the skin has not been overlookd; but, it is only until within a few years, that the skin itself has recieved that degree of attention, to which, its minute and complex structure, its sensibility and intimate sympathy with the various internal organs, entitles it. Previously to considering the associated actions maintained between the skin and the internal organs, and their connexion thro' the medium of the mucous membrane, it will be proper to present a brief view of the anatomical structure of the skin. This apparently simple envelope, serves the sveral purposes of binding together, and of protecting the internal parts; of excreting a large quantity of perspiratory matter, and of establishing an intimate relation between the living system and external substances. It is divided by anatomists into three distinct layers,

the principle of which, constituting the chief bulk of the skin, is the cutis vera. This is a compact and strong areolar tissue, composed of a firm fibrous substance, with numerous vacuities or intervals. On its external surface, it is close and compact resembling the smooth continuity of a membrane, but on its opposite surface, where the fibrous portion is blended with subjacent cellular substance, the texture is more loose, and the areolae are larger. When immersed in water it becomes softer, by a seperation of its fibres, and its intervals are rendered more distinct. Examined in this state, the areolae are found to penetrate its whole thickness, and to serve for the purpose of transmitting to the surface the hairs, exhalents and absorbents. The areolar tissue of the cutis vera is permeated by countless myriads of arterial and venous ramifications, whose capillary divisions occupy the external or compact surface of this part, and form a vascular network over the whole body. This is rendered obvious in the glow

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the glow of exercise and the flush of shame; in the excitement of fever and in the eruptive stage of Exanthematous diseases; when this part becomes surcharged with blood. This may also be proved post mortem by the injection of coloured fluids. These vascular ramifications are found to be particularly numerous in those parts, which possess most exquisite sensibility. The absorbents of the skin are nearly equal in number to its bloodvessels, and numerous nerves enter it in all its parts, distributing their larger ramifications in situations occupied by the papillae. The cuticle, the exterior layer of the integuments, is the thin transparent pellicle, which is raised by a blister. In its natural state, it adheres almost inseparably to the subjacent parts. It presents no traces of fibres, laminae or cells, and, in it, we can discover neither bloodvessels, absorbents nor nerves. It is perforated by hairs, by the excretory tubes of the cutaneous follicles, by the exhalent mouths of the capillary vessels, and, probably in some parts by absorbent orifices. It is insensible and supp

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and supposed incapable of performing any vital actions, and has been, emphatically, denominated, inorganic and extravascular. The external covering of the body would, hence, appear to be but a dead membrane, placed as a protection to the finely organized and delicate parts beneath, and as an insensible medium for the communication of external impressions; for we find, if this part be thickened preternaturally, that sensation is in a great measure destroyed, and, if it be removed, the contact of bodies gives pain and does not impart the appropriate impression of touch. The remaining portion of the skin may be regarded as a delicate stratum interposed between the parts already described, and is denominated rete mucosum. It has derived its name from the softness of its texture and its netlike appearance, which is produced by the perforations of hairs, papillae and other parts coming to the surface. It is the seat of all the variety of colour, which has been observed in

the human species. The skin considered as one membrane may be regarded as the sensitive limit of the body. Placed at the extremity of its organs, and incessantly exposed to external influence, it forms one great connexion between animal existence and external objects. From this brief anatomical view, it is obvious, that the skin is adapted to hold important relations with various other parts of the system. In it, are represented the nerves, arteries, veins, and absorbents, especially the capillary portion of the vascular system, which is so essentially concerned in all the vital functions. I shall next point out the sympathies of this part with some of the internal organs. The first, which naturally presents itself to our notice, is that, which exists between the skin and the lungs, denominated *Cutano Pulmonic* sympathy. This is so strongly marked, that to insist upon it, would seem almost superfluous; but as it is the source of some of our most formidable diseases, I shall

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consider it somewhat in detail. The principle agent, operating on the skin in the production of disease, is atmospherical vicissitudes, aided by moisture. A reference to the state of the atmosphere, and to the diseases peculiar to the different portions of the atlantic division of the United States, will incontestably establish the truth of this position. In the eastern portion, where we have great and sudden vicissitudes, with much mosture, we find all the forms of pulmonic disease predominating and prevailing to a very great extent. In the middle portion, where these vicissides are still sudden and considerable, and the moisture is also great, but where they do not obtain to the same extent, there is a considerable decrease of pulmonic disease and a proportional increase of rheumatic affections. In the southern states, where these changes are less frequent, and the country is, in a great measure,

alluvial and abounding in marshes and stagnant waters, we find these forms of disease giving place to Intermittents and all the various forms of bilious disease. These portions of the United States have been emphatically denominated the Pulmonic, Rheumatic and Bilious sections of the Atlantic states. The effects of temperature on the Pulmonic system through the medium of the skin, independenly of the proofs derived from daily observation, may be illustrated by direct experiment. It is observed by Mr James Johnson that on immersing the body in water below the temperature of the skin, the vessels on the surface are struck torpid and the blood is determined to the interior. At this moment a sympathetic torpor takes place in the capillary vessels of the lungs, so that the blood is with difficulty transmitted thro' them, occasioning that Dispnoea or panting for breath, which we observe in all but more particularly in delicate persons

at the moment of immersion. But here reaction soon takes place - The ballance of the circulation is restored and the functions of the skin are renewed with increased activity, succeeded by exhiliration of spirits and renovated energy. But should there have been previously to immersion exercise sufficient to induce fatigue or excess of perspiration to weaken the extreme vessels on the surface, then the torpor of the extreme vessels of the skin cannot be properly overcome by reaction, the ballance of the circulation is not completely restored, and the lungs or other internal organs are injured, attended with more or less fever according to the force of the operating cause. The sympathy, I am contending for, recieves additional support from the fact, that no means have yet been discovered, so invariably successfully in the cure of chronic Pulmonic disease, as

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the application of nonconductors to the surface of the body. In a great number of cases, I have seen flannel prescribed to be worn next the skin and in numerous slight cases, have found ~~them~~ it amply sufficient for the cure, and, in all cases, a highly usefull auxiliary. Another proof, in support of this sypathy, may be drawn from the enormous waste of life, which dernial vicissitudes occasion, by operating upon the delicate lungs of females through the medium of the skin. This results from their frequent exposure to the chilly damps of night, after the perspiratory vessels have been overexcited in crowded rooms, or fatigue has been induced by the seductive exertions of the dance.

The Cutano Gastric sympathy, as its name imports, is the association of action between the skin and the stomach. This sympathy

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has been particularly observed and described by Cullen, in his exposition of the proximate causes and phenomina of fever. He remarks, that from many circumstances it is sufficiently certain, that there is a consent between the stomach and the surface of the body; that this consent particularly appears, from the connexion between the state of perspiration and the state of the appetite in healthy persons; that cold, applied to the surface of the body when it does not stop perspiration, proves a stimulous to the surface, and is a powerfull means of exciting appetite." Dr. Cullen therefore attributes the anorexia, nausea, and vomiting, which occur in febrile affections to this cause; and in support of this doctrine adduces the fact related by Sydenham in his description of Plague, in which vomiting could only be allayed by exciting the surface, so as to

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induce perspiration. This sympathy is further illustrated by the frequent occurrence of pain in the stomach and indigestion from the application of cold and moisture to the feet. There are few who have not suffered more or less from this cause. Delicate females with tight dress and thin shoes are particularly obnoxious to it. Hence, although they are infinitely more temperate in food and drink than men, yet they are more subject to Cardialgia, Flatulence and all that train of distressing symptoms, which arise from a disordered state of the stomach. So strongly impress'd was the late Dr. Rush with the belief, that numerous diseases originated from this source that he emphatically called the feet "the high road to disease". But the impression which some medicines evidently make upon the skin, in a very short time after their reception into the stomach, affords the most remarkable proof of this connexion;

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and here I speak of those, which act not through the medium of the circulation. e.g. I have seen nitrous powders, in a quarter of an hour convert a hot, parched skin into a perspiring one. The next association of the skin with the internal organs, which I shall notice is that, which exists between it and the intestines denominated <u>Cutano-Intestinal sympathy</u>. There is surely any cause of functional disorder in the intestines, so common as that, resulting from external impressions on the skin. Suppressed perspiration and cold or moisture applied to the feet, frequently induce Diarrhea & Colic, and a highly dangerous state of Enteritis is frequently brought on by atmospherical vicissitudes or cold applied to the skin during or subsequent to a state of perspiration. The milder forms of Dysentery are met with in most places, but in elevated ridges of low districts of country, in which marsh effluvia and

atmospherical vicissitudes are combined, this disease frequently assumes an obstinate and malignant form, which renders it as mortal and alarming, as those fatal endemics, which ravage our larger cities. This sympathy will be rendered more apparent, from considering the great relief afforded, in Colica Pictonum and other spasmodic diseases of the intestines, by dashing cold water on the legs and thighs or from standing with bare feet upon cold pavements. The Cutaneo Renal sympathy is that connexion, which exists between the skin and the kidneys, and is chiefly deserving of consideration on account of the vicarious actions of these organs during a state of health. This sympathy, however, should not be lost sight of in disease, for we find, that calculous affections, as also other diseases, in which the kidneys are concerned are irritated and increased by exposure to cold, and that few

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that few remedies have been so effectual as the warm bath. The last sympathy, which I shall notice is that, which exists between the skin and liver, called the Cutano Hepatic sympathy. This was distinctly noticed and particularly described by Mr. Johnson in his valuable work on the diseases of tropical climates. It was, by attentively observing diseases in those districts of country, where hepatic affections are most abundant, that he was led to remark the very intimate relation, which exists between the functions of the skin and those of the liver. It is a well known fact, that, in tropical climates, and in the hot season of more temperate regions, when perspiration is abundant, biliary secretion is also in excess, and that checked perspiration is always, attended with a corresponding diminution of biliary secretion —

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cutaneous and biliary secretion debilitates the vessels, by which these processes are carried on, and hence they are the more easily rendered torpid by the application of cold. Accordingly we find Hepatitis, Cholera Morbus &c, to prevail in hot climates, and during the hot season in more temperate regions, and also to occur during the the night season, when the atmosphere is considerably cooler than that of the preceding day. Such are some of the pervading sympathies of the skin with the internal organs. The fact of their existence and the important indications, which they point out in the cure of diseases have not been overlooked, but the mode of their production has been deemed inexplicable and beyond the ken of human research. This I apprehend has arisen, in part, from the vague and indiscriminate application of the term Sympathy. It has been made to denote, not only the associated action of parts, between which a direct

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direct connexion, in anatomical structure, can be traced, but also of those parts where no such connexion exists. Upon reviewing these sympathies of the skin with the internal organs, there is one circumstance, which must impress us with the idea of a connexion less mysterious than is usually imagined. All the different viscera, which have been just stated to respond in their actions to the impressions made on the skin, are lined by a direct extension from this organ. The mucous membrane passes from the skin through all the natural apertures of the body to become, as Bichat has sufficiently demonstrated, the internal cutaneous system of the hollow viscera, which communicate externally. The lungs are supplied with this lining membrane, which after covering the internal surface of the fauces, passes down into the larynx and trachia, and, of course, into the bronchiae, and thus supplies their whole internal surface.

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The liver is also lined in the same manner; for the mucous coat of the duodenum is continued up through the ductus communis choledochus both into the gall-bladder and the pori biliarii. In like manner the mucous membrane passes thro' the ureters into the infundibulum and tubuli uriniferi of the kidneys. This membrane, though modified in its structure and functions, according to the necessities of the parts, to which it is appropriated, still preserves, in its remotest passages, the general characteristics of the skin, with the exception of the peculiar pigmentum nigrum, which imbeded in the rete mucosum of the external skin, produces the varieties of colour thro' the translucent cuticle. The laminae of both systems are exactly analagous. As the cuticle sends down its vaginal processes through the glandular follicles of the skin, so the epithelium of the mucous tissues

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gives a corrisponding lining through all the hollow passages. The vascular tissue, demonstrated by Baynam, upon the surface of the cutis, is asserted by Bichat to exist between the corrisponding laminae of the whole mucous membrane. In both tissues the vessels and nerves are found to ramify in exact similarity. As the skin by its nervous papillae takes cognizance of external bodies in touch, so the analagous terminations of the nervous fibrils in the different portions of the interior membrane convey the impressions of sapid and odoriferous particles to the mind. As the perspiratory fluid is secreted on the external surface and performs the office of maintaining the associated functions in exactest harmony, so the mucous fluids secreted on their surfaces, keep up the sentient motions peculiar to each organ. It is a general law of the animal economy, too well known to need much elucidation, that each system of parts is naturally disposed

to exist in the same state of energy and excitement. Thus an irritation in any part of the arterial system, though at first only the neighbouring tubes may be excited, eventually produces the same degree of action throughout the whole circulation. It is the struggle to accomplish this end, which creates the inflammatory and sympathetic fever of wounds &c. In the alimentary canal, this law is however most remarkably illustrated. Some purgatives introduced into the stomach excite a general evacuation of the large intestines long before they can travel beyond the pylorus. An irritation in the fauces or oesophagus excites inverted motions for its discharge; and often the stomach joins in the same action. Indolent hemorrhoidal tumours, and hard bodies in the rectum have been known to produce severe intestinal derangement, and many obstinate Dyspepsias have depended

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upon the existence of fistulas in ano. Now when we recollect, that the skin extends itself into the mucous membrane, and this forms the internal secreting surface of all those organs, which communicate with it by the external apertures, it will not appear more astonishing that these viscera, which I have shown to be sympathetically connected with this extensive tissue, should show the same disposition. An impression made upon one part of its surface and producing a consequent action there, the whole organ exerts itself to harmonize in the same motions: and thus functions, which at first sight might be supposed widely diverse, are operating under the same excitement, and may surely be considered as subject to the general law, which I have mentioned as influencing all the other systems.

J. Underwood. No 266 Arch

Dr Chapman